AWIPS SYSTEM MODIFICATION NOTE 20, REVISION A
(for Electronics Systems Analysts)
Maintenance, Logistics, and Acquisition Division
W/OPS12: JCS

SUBJECT	:	River Ensemble Processor (REP) Installation Instructions
PURPOSE	:	To provide installation instructions for the REP at RFCs.
EQUIPMENT AFFECTED	:	AWIPS
PARTS REQUIRED	:	REP rack with supplied cables and ProCurve Transceiver modules
SPECIAL TOOLS REQUIRED	:	Standard site toolkit
MODIFICATION PROCUREMENT	:	None.
EFFECTIVITY	:	All RFCs must perform this modification.
ESTIMATED TIME REQUIRED	:	4-5 hours.
EFFECT ON OTHER INSTRUCTIONS	:	The reason for this revision is the addition of the REP Tape Backup Installation Procedures (Attachment C). This revision supercedes AWIPS Modification Note 20. File this note in EHB-13, section 5.0.
AUTHORIZATION	:	The authority for this modification note is Request for Change AB404.
VERIFICATION STATEMENT	:	This procedure was tested and verified on the NMTR platform at SLVM2 (Silver Spring, MD), OHRFC TIR (Wilmington, OH), and NCRFC MSR (Chanhassen, MN).

GENERAL

This modification note provides installation instructions for the River Ensemble Processor at RFCs. The REP equipment will be mounted in the REP rack (Figure 1) and configured for the site by Northrop Grumman IT (NGIT). The assembled rack will be delivered and placed in the site-identified location prior to the scheduled installation date.

REP CONFIGURATION

The REP hardware consists of a large storage device called Network Attached Storage (NAS) and two dual-processor computers. The NAS is a Redundant Array of Independent Disks (RAID), so the disks back each other up. If one fails, the others take over. In the current configuration, the NAS has 340 gigabytes of storage with 100 gigabytes partitioned into a directory named `/awips/rep`. This partition is visible (mounted) to the workstations (LXs) and the REP servers. The additional storage can be configured as desired, and if additional storage beyond 340 gigabytes is needed, additional disks can be added to the NAS.

The REP processors are simply Linux boxes like the PX, but faster. They have Red Hat 7.2 installed, and can see the storage on the NAS. Jobs are submitted via remote shell commands to one processor or the other, and chronological jobs may be set up to run on either processor. The two processors back up each other so if one fails, jobs submitted to the failed processor will execute on the one still running.

The REP NAS disks and Linux processors are all attached to the AWIPS high-speed RFC Local Area Network (LAN), and can be accessed like any other device on the LAN.

PRE-INSTALLATION GUIDELINES

The site must identify a location for the 24" wide x 40" deep x 79" high REP rack, with 36" front and back clearance. The location must be within 30 feet of both the AWIPS RFC and WFO equipment racks. The site must provide two 120-volt, 20-amp electrical circuits and an “AWIPS style” floor tile cutout at the rack location. **In the enclosed inventory list, verify all parts and cable labels in accordance with Tables 1 and 2 (page 7) before beginning the installation.**

NOTE: Some parts enclosed in the shipment are extras and are not listed on the inventory list.

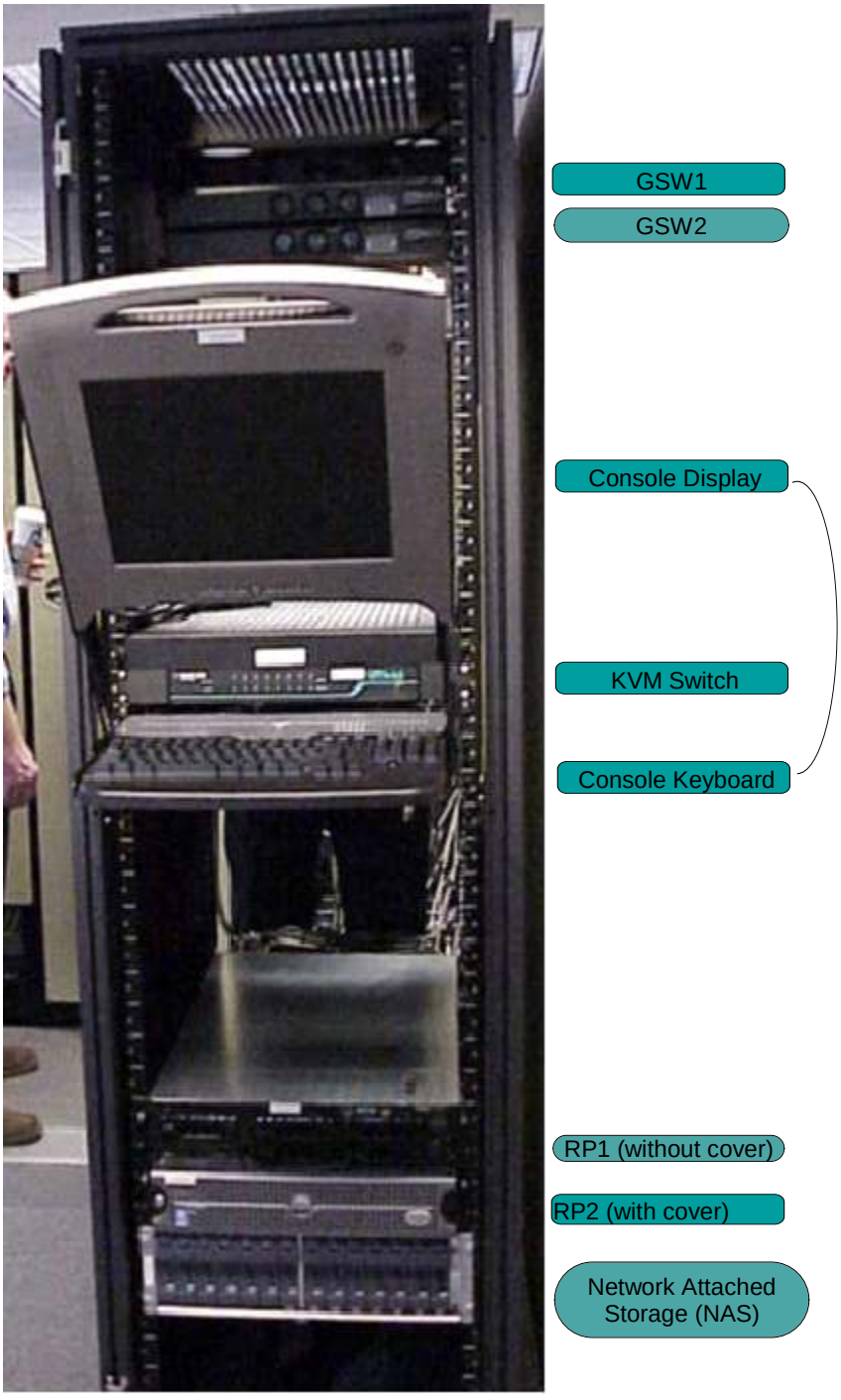


Figure 1: REP Rack Contents

PROCEDURE:

A. RFC REP Rack Installation

1. Lower the leveling feet on the bottom corners of the rack until they are level with the floor.

2. Unstrap the tie wraps on the keyboard/display console.

NOTE: Ensure that an electro-static discharge (ESD) strap is worn before performing the following steps.

3. Remove the cover plate from Transceiver Port 25 on HSL/SW1 (located on DS1 rack – Figure 2).

Figure 2: Transceiver Port 25

4. Install the Procurve 100/1000-T Transceiver (Figures 3 and 4) in Port 25 until a click is heard, and retain the removed cover plate **if** the label is on it. If the cover plate is retained (i.e., removed plate has label on it), perform sub-steps **a** and **b**. If not, proceed to step 5.

   a. Remove the cover plate from Port 26.

   b. Use the retained cover plate to replace the cover plate removed in sub-step **a**.

Figure 3: Procurve Transceiver

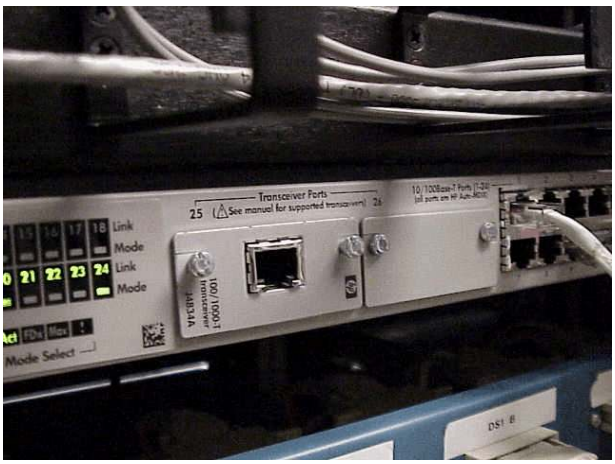


Figure 4: Installed Transceiver

5. Repeat steps 3 and 4 for HSL/SW2.

NOTE: At this time, notify the forecasters that the Local Area Network (LAN) connection will be down for 2-3 minutes.

The only impact on the forecasters is when the NCF resets the ProCurves. This time can be closely coordinated with the NCF engineer and the forecasters if necessary.

6. Call the Network Control Facility (NCF) at 301-713-9344 and have them verify that the Xyplex ports have been configured.
7. Contact the NCF so they can set the Spanning-Tree path cost for Port 25 and activate the transceiver.
8. **NCF Step:** Log in to HSL/SW1 and set the path cost for Port 25 to 1 (one).
9. **NCF Step:** Verify the path cost for Port 25, save the new configuration, and reset the switch to activate the transceiver.
10. **NCF Step:** When HSL/SW1 is back online, repeat steps 8 and 9 for HSL/SW2.

11. Route the LAN and Monitor & Control (M&C) cables through the cable management arms of RP1 and RP2 (Figure 5) to the destinations indicated on the cable labels. The M&C cables go to the WFO system Xyplex because the RFC Xyplex is too full. (Refer to Tables 1 and 2 on the next page for cable descriptions.) If necessary, pull out the RP units to make room for the cables.

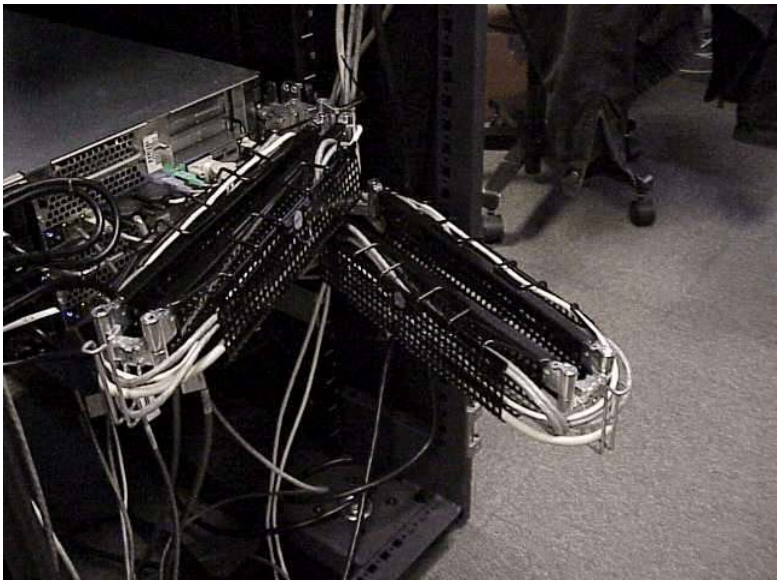


Figure 5: Cable Management Arms

Table 1: Pre-installed REP Cables

Wire Number	Part #	Description	Source Device	Source Identifier	Dest. Device	Dest. Identifier
LA1AW154	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	RP 1	Port Gb 1	RP/SW 1	Port 4
LA1AW155	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	RP 2	Port Gb 1	RP/SW 2	Port 4
LA1AW156	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	RP 1	ERA Mgmt	RP/SW 1	Port 3
LA1AW157	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	RP 2	ERA Mgmt	RP/SW 2	Port 3
LA1AW158	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 1	Port 1	RP/SW 1	Port 1
LA1AW159	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 2	Port 1	RP/SW 1	Port 2
LA1AW160	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 1	Port 2	RP/SW 2	Port 1
LA1AW161	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 2	Port 2	RP/SW 2	Port 2
LA1AW162	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 1	Port 3	NAS	Port A
LA1AW163	NWS5115	CBL, RJ45-RJ45 CAT5e, 10FT	GSW 2	Port 3	NAS	Port B
DS1AW45	NWS3631	CBL,PTCH X,4FT 6IN 4PR RJ45-RJ45 CAT5	RP 1	Port Gb2	RP 2	Port Gb2
DS1AW46	NWS5372	DB9 F/F NULL MODEM ASSY 5 FT	RP 1	Serial 2	RP 2	Serial 2

Table 2: Packaged REP Cables

Wire Number	Part #	Description	Source Device	Source Identifier	Dest. Device	Dest. Identifier
LA1CW178	NWS5113	CBL, PLENUM, RJ45-RJ45 CAT5e, 50FT	GSW 1	Port 24	HSW 1	Port 25
LA1CW179	NWS5113	CBL, PLENUM, RJ45-RJ45 CAT5e, 50FT	GSW 2	Port 24	HSW 2	Port 25
LA1CW180	NWS3050	CBL, 50FT DB9F-RJ45 SOL C	RP 1	Serial 1	WFOC M & C	Port 14
LA1CW181	NWS3050	CBL, 50FT DB9F-RJ45 SOL C	RP 2	Serial 1	WFOC M & C	Port 15
LA1CW182	NWS3050	CBL, 50FT DB9F-RJ45 SOL C	GSW 1	Console	WFOC M & C	Port 12
LA1CW183	NWS3050	CBL, 50FT DB9F-RJ45 SOL C	GSW 2	Console	WFOC M & C	Port 13
LA1CW184	NWS3534	CBL, 50FT RJ45-RJ45 SOL C	NAS	Console	WFOC M & C	Port 16

12. Connect the REP end of the NAS M&C cable to the NAS at the bottom of the rack.
13. Connect the REP end of the LAN cables to Port 24 of GSW1 and GSW2 as indicated on the cable labels.
14. Connect the other end of the LAN cables to the newly installed transceivers in HSL/SW1 and HSL/SW2 as indicated on the cable labels.
15. Connect the other end of the M&C cables (RJ45 connector) to the appropriate M&C ports as indicated on the cable labels.
16. Place RP/SW1 and RP/SW2 on the rack shelf (Figure 6) and connect the LAN cables as indicated on the cable labels.

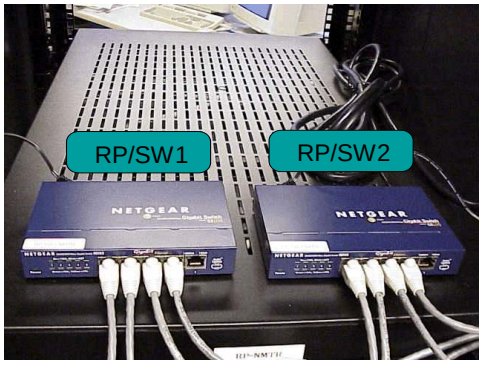


Figure 6: RP Switches

17. Connect RP/SW1 and RP/SW2's power cords to RP/SW power jacks located on the front of RP/SW1 and RP/SW2.

18. Plug the two REP rack power strips into the site-designated power receptacles and apply power to the rack.

B. REP Installation Script Execution

Execute the following steps after the REP rack has been installed (i.e., section A has been completed). The script `/data/local/REP/install_REP` will be staged at the site prior to installation.

1. Establish a console connection to the REP NAS:

   a. On the WFO System Console, exit the Xyplex menu by typing **`quit`** at the prompt.

   b. At the ***`Xyplex>`*** prompt, type **`c xyplex1:3600`**

2. Pull out the keyboard/display console on the REP.

NOTE: When the console is fully extended, a click can be heard. To close the console, depress the silver tabs on either side of the keyboard (Figure 7) and slide the keyboard/display console back in.

Figure 7: Silver Tabs (circled)

3. Apply power to the NAS and watch it boot at the console (the power switches are on the rear of the unit, above the power cords). If the boot process stops at the ***`CFE>`*** prompt, type **`autoboot`** **<Enter>** and the NAS will continue the boot process.

4. After the NAS has completed the boot process, return to the `Xyplex>` prompt by pressing the <Break> key and then establish a console connection to RP1 by typing **`c xyplex1:3400`**

5. Apply power to RP1 and watch it boot at the console (the power button is located behind the bezel on the front, lower right side of the unit). If the RP fails to completely boot, call the NCF at 301-713-9344.

6. Establish a console connection to RP2 by typing **`c xyplex1:3500`** and repeat step 5 for RP2.

7. Select number **1** on the Keyboard Video Monitor (KVM) switch in the REP rack to select RP1 (Figure 8).

8. Log into RP1 as `root` (password `root`) via the display/keyboard in the REP rack.

9. Change the root password to the site's root password by typing:

   `passwd`

10. Rlogin into to RP2 as `root` (password `root`). Change the root password to the site's root password by typing the following:

Figure 8: KVM Switch

`rlogin rp2 –l root` (Note that "**`-l`**" is L, not 1)
`passwd`
`exit` [Exit back to RP1]

11. Telnet into NS1 and change the root password to the site's root password:

    `telnet 165.92.`*`xx`*`.79` (password `root`)

    `passwd`

    Press **Ctrl-D** to exit

12. From a different terminal, log into DS1 as `root` and type:

    `su - root`

13. Perform an rlogin to PX2 and execute the REP activation script by typing the following:

```
rlogin px2 -l root      (Note that "-l" is L, not 1)
mkdir -p /local/install  (if directory does not exist)
script -a -f /local/install/install_REP.out

cd /data/local/REP
./install_REP           (This will take about 3mins)
```

NOTE: If either RP hangs, call the NCF.

```
exit        [Exit from scripted output file]

exit        [Exit back to RP1]
exit        [Logoff RP1 at rack's display/keyboard]
```

NOTE: Ignore any "Workstations not set" errors.

C. REP Test and Verification

1. As superuser `oper` (**`su - oper`**), login/rlogin to RP1 and type the following:

   `cd esp_test`
   `script -a -f testREP.out`
   `./runall` (The script should take approximately 1 hour and 15 minutes to run)

   Progress can be tracked by tailing the `runlog.`<*`date`*> file in the `/home/oper/esp_test` directory from another window.

NOTE: The script is complete when the last visible character is a “4" in the runlog.<*date*> window.

2. Once the script is complete, verify the result by typing the following:

   `./checkrun`
   `ls -ltr file_check*`
   `diff file_check.<date> sample.out` (where <*`date`*> is the date that the script was executed as *yyyymmdd*)

NOTE: The files should be the same. If they are not, contact the NCF.

`exit`

D. Verification of Automatic Failover of NAS Gigabit Ethernet

1. From a Linux workstation (LX), open two Telnet windows.
   a. In one window, ping NS1 by typing:

      `ping ns1`

      Verify that a response has been received.
   b. In the other window, Telnet (as `root`) into FAS250 by typing:

      `telnet ns1`
   c. Verify which link is the active link by typing:

      `vif status vif1`
2. Disconnect the cable of the active link on the NAS (e0a is on the left and e0b is on the right).
3. Verify the ping is still working and type the following to verify that the other link is now active:

   `vif status vif1`
4. Reconnect the cable from step 2, and disconnect the other link cable.
5. Repeat step 3 to verify that NS1 is still up.
6. Reconnect the cable that was disconnected in step 4 and exit from the Telnet windows.

REPORTING INSTRUCTIONS:

Report the completed modification using the Engineering Management Reporting System (EMRS) according to the instructions in NWS Instruction 30-2104, Maintenance Documentation, Part 4, Appendix F. Include the following information on the EMRS Report:

Block #	Block Type	Information
5	Description	Install the River Ensemble Processor (REP)
7	Equipment Code	AWIPS
8	Serial Number	001
15	Comments	Installed the REP I.A.W. AWIPS System Modification Note 20, Revision A.
17a	Mod. No.	20A

A sample EMRS report is provided as attachment A.

Dominic Bosco for

Digitally signed by Dominic Bosco for
DN: cn=Dominic Bosco for, c=US
Date: 2004.07.12 10:35:38 -04'00'

Signature Not Verified

Mark S. Paese

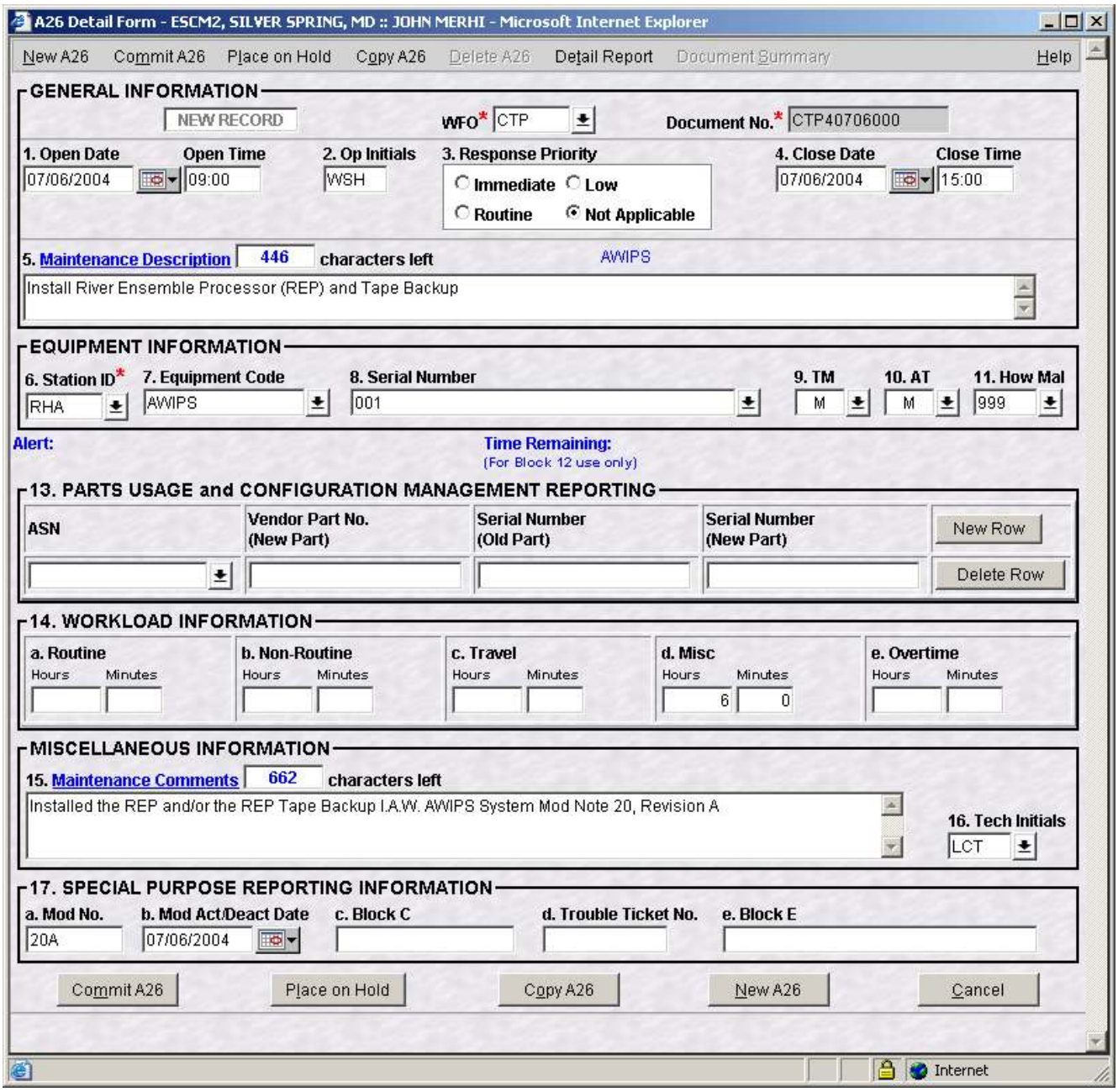
Director, Maintenance, Logistics, and Acquisition Division

Attachment A - EMRS Report Sample

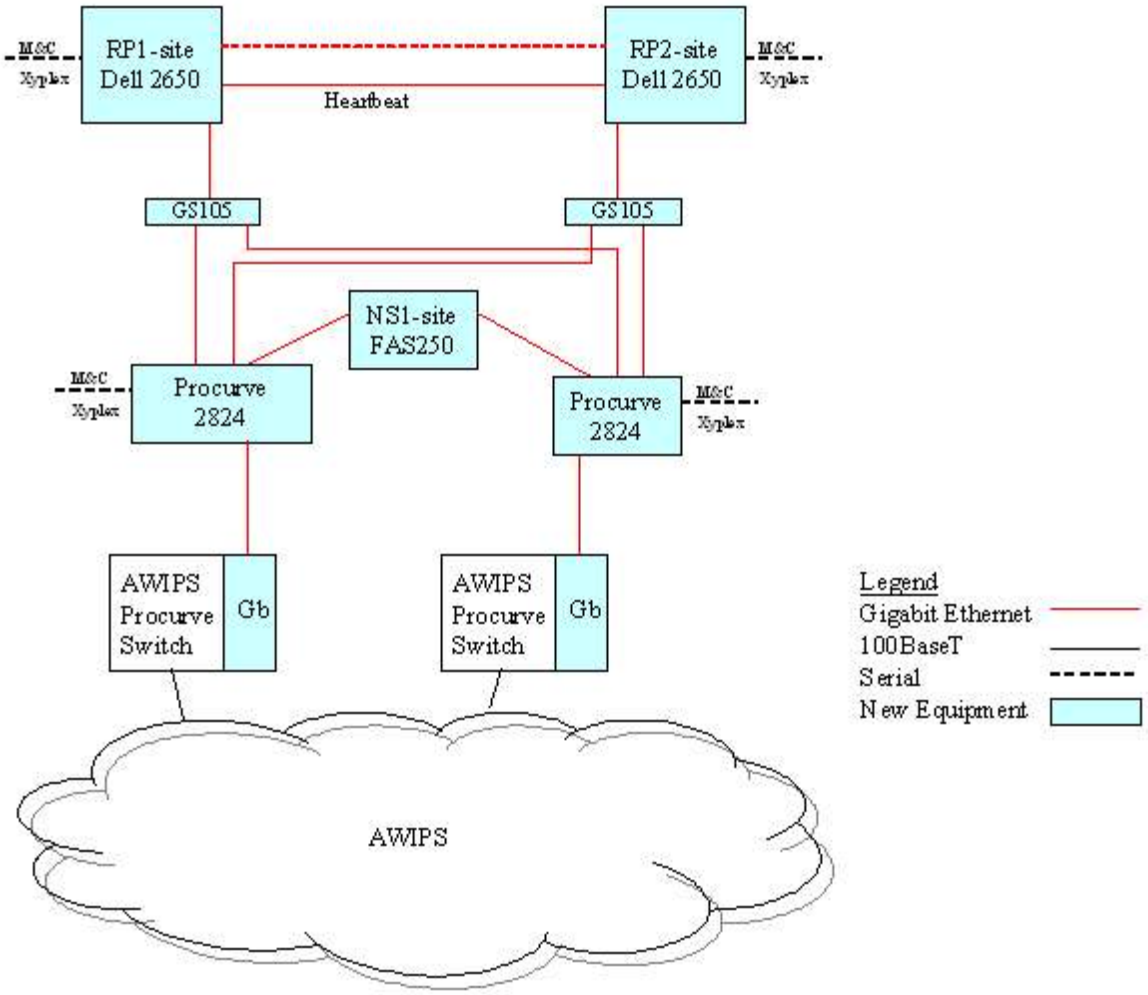
Attachment B - REP Design

Attachment C - REP Tape Backup Installation Procedures

Attachment A - EMRS Report Sample



Attachment B - REP Design



Attachment C - River Ensemble Processor (REP) Tape Backup Installation Procedures

NOTE: Both the REP Network Attached Storage and the Fibre Channel – SCSI Bridge have been pre-configured for interoperability.

1. Unpack the equipment.
2. Set the LTO-2 tape drive on the shelf in REP Rack.
3. Place the FC-SCSI Bridge on top of the LTO-2 tape drive.
4. Connect the FC-SCSI Bridge to the LTO-2 tape drive using cable # DS1CW4 (NWS5639).
5. Remove the FC terminator from the FC Port on the NAS and connect the FC-SCSI Bridge to the NAS using cable # DS1CW3 (NWS5637). Store the FC terminator is a safe location.
6. Connect FC-SCSI Bridge and LTO-2 tape drive power cords into Power Strip #2, Receptacles 2 and 3 (counting from left to right viewed from the rear of the rack), respectively.
7. Power on the bridge and the tape drive. The power switch for the bridge is located on the top, left, rear corner above the power cord. The power switch for the tape drive is located on the bottom, left, front corner of the device.
8. Insert the 200-GB LTO-2 tape (provided) into the tape drive.
9. Log into the NAS via the Xyplex console as root and verify that the NAS recognizes the tape drive. At the ***NAS1>*** prompt, type **`sysconfig -t`** and observe the output. The output should appear as follows:

```
Tape drive (0c.0)  HP Ultrium 2-SCSI
rst0l  -  rewind device,        format is: HP (200GB)
nrst0l -  no rewind device,     format is: HP (200GB)
urst0l -  unload/reload device, format is: HP (200GB)
rst0m  -  rewind device,        format is: HP (200GB)
nrst0m -  no rewind device,     format is: HP (200GB)
urst0m -  unload/reload device, format is: HP (200GB)
rst0h  -  rewind device,        format is: HP (200GB)
nrst0h -  no rewind device,     format is: HP (200GB)
urst0h -  unload/reload device, format is: HP (200GB)
rst0a  -  rewind device,        format is: HP (400GB w/comp)
nrst0a -  no rewind device,     format is: HP (400GB w/comp)
urst0a -  unload/reload device, format is: HP (400GB w/comp)
```

NOTE: If the output does not appear as shown in step 9, contact the NCF for assistance.

10. Replace the heartbeat LAN cable connecting the Gb2 Ports of RP1 and RP2 (DS1AW45, NWS3631) with the new DS1AW45 cable (NWS5525) making sure that the new cable is nicely tucked away in the Dell Cable Management Arms.
11. Replace the existing cable labels on the LAN cable (NWS3631) disconnected from RP1 and RP2 in the previous step with the supplied cable labels (cable # LA1AW164). Connect the two ProCurve Gigabit Ethernet Switches using this cable
12. Replace the heartbeat serial cable connecting the Serial 2 Ports of RP1 and RP2 (DS1AW46, NWS5372) with the new DS1AW46 cable (NWS5646) making sure that the new cable is nicely tucked away in the Dell Cable Management Arms. Disposition of the replaced serial cable (NWS5372) is at the discretion of the site.

REP Tape Backup FMK Contents

Part Number	Description	Qty
NWS5638	LTO-2 STANDALONE TAPE DRIVE (200GB/400GB)	1
NWS5647	FIBREBRIDGE 1180D, DESKTOP, FC TO ULTRA SCSI BRIDGE	1
NWS5637	CABLE, HSSCD2 TO DB9, 3 METER	1
NWS5639	CABLE, HDTS68-HDTS68, 3FT	1
NWS5636	LTO-2 200GB/400GB TAPE CARTRIDGE	2
NWS5525	PATCH X CABLE, 10FT	1
NWS5646	Cable, DB9 F/F Null Modem Assy. 8ft.	1
N/A	Replacement cable labels	1 set

Usage of the Dump and Restore Commands

The FAS250 provides built-in capability for backup and restore to a locally or remotely attached tape device. These backup/restore capabilities are provided via the dump and restore commands respectively. These commands can be run locally on the FAS250 or via shell scripts from a remote device via `remsh`.

Dump Command

The `dump` command is used to make backups of volumes/qtrees on the FAS250 to a locally or remotely attached tape drive. The format of the **dump** command is:

dump *options [arguments…] tree*

The following options will be the most widely used while using the **dump** command.

0-9 Dump levels. A level 0 is a full backup, and any number above 0 is an incremental backup since the last dump of a lower level.

f Write the backup to the specified files, where in most cases, the file will be the device name of the tape drive. These names can be obtained by running the **`sysconfig –t`** command on the FAS250.

u Updates the **`/etc/dumpdates`** file after a successful dump.

v Verbose mode. The **dump** command prints out detailed information during the dump.

For example, to do a full backup, the following command is issued:

```
dump 0fuv rst0a /vol/vol0/share
```

For additional options/questions concerning the dump command reference the:

Data ONTAP 6.4 Commands: Manual Page Reference page 93.

Restore Command

The `restore` command is used to restore volumes/qtrees, directories, or individual files from a locally or remotely attached tape device. The format of the restore command is:

`restore` *`options [arguments…] [files …]`*

The following options will be the most widely used while using the **restore** command.

f The name of the archive to use. Which in most cases will be the device name for the tape drive used during the **dump** command.

x Extracts the name files from the tape. Where *files* can be a volume, qtree, directory, or individual files. If no *files* argument is specified the backup root directory is extracted. This results in a full restore.

v Verbose mode. The verbose mode causes the **restore** to output the name of each file and its type.

y Will automatically answer “yes” should **restore** prompt for user conformation.

For example, to do a full restore, the following command is issued:

`restore xfvy rst0a /vol/vol0/share`

For additional options/questions concerning the dump command reference the:

Data ONTAP 6.4 Commands: Manual Page Reference page 251.